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Corporate Financial Leverage and M&As Choices: Evidence from the Shipping Industry

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ABSTRACT

High capital intensity and reliance on debt financing are among the most prominent characteristics of the shipping industry. The corporate finance literature has documented that beyond a certain threshold, leverage can hamper a firm's ability to raise capital, and as a result, have a bearing on its corporate investment policy. The new, more restrictive, financing landscape in the shipping sector has put the management of capital structure on the spotlight as a key driver of investment policy, financial health, and thus, firm success. In this paper, we examine for the first time the link between the financing policy of shipping companies and their corporate investment decisions. We focus on the impact of deviations from target capital structure on mergers and acquisitions (M&A); an increasingly important corporate growth vehicle for shipping companies, with directly measurable outcomes. Deviations from optimal leverage display a strong association with the likelihood to consummate acquisitions, deal size, the financing method as well as the M&A outcome. Higher debt levels are shown to have a negative effect on acquisitiveness and a positive effect on the quality of corporate investment; a pattern with direct policy implications for shipping companies, their management teams, and shareholders.

Keywords: *Mergers and acquisitions, shipping industry, financial leverage, financial management, capital structure*

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1. Introduction

The shipping industry is one of the most capital-intensive. Shipping companies' CAPEX-to-Assets ratio averaged around 8% between 1990 and 2018, placing the sector among the top 8th percentile of all sectors.[1] In deep-sea freight transportation, capital investments are almost exclusively associated with vessel purchases, which are in turn financed with debt at more than 40% of capital employed for the average firm (Drobetz et al., 2013). The idiosyncratic characteristics of the shipping industry including the high asset tangibility and equity risk environment, have naturally led to more debt-driven capital structures. More recently, the sector has reached critical levels of borrowing with the world's top 40 banks having a $345bil exposure to the shipping industry (Petrofin, 2018), and an estimate of $150bil of loans provided by European banks alone considered distressed (Reuters, 2017).[2] The high capital intensity and reliance on debt financing associated with shipping companies, coupled with the financial constraints brought forward by the new financing environment, suggest that the success of a shipping company is highly sensitive to its debt policy since deviations from target capital structures can lead to a high cost of financial distress (Drobetz et al., 2013). The corporate finance literature has provided ample evidence that a high degree of leverage in a firm's capital structure can hamper its ability to raise more capital (Hovakimian et al., 2001; Fama and French, 2002; Flannery and Rangan, 2006) and, as a result, limit its flexibility in devising corporate investment policy (Harford et al., 2009; Uysal, 2011; DeAngelo et al., 2011). The impact of financial leverage on corporate investment policy can be more pronounced in the shipping industry due to its idiosyncrasies, making it a natural laboratory to study the effects financing policy on corporate investment.

Due to an over-supplied and highly fragmented market, the shipping industry has more recently seen a remarkable wave of consolidation. Between 2008 and 2018, the total value of mergers and acquisitions (M&As) in the sector was more than $566bil, corroborating the view that M&A investments are increasingly viewed as a vital path to growth (inorganic), along with CAPEX (organic growth) which is typically linked to the S&P and newbuilding markets.[3] M&As often require external funds as they involve significant amounts of capital (Bharadwaj and Shivdasani, 2003; Harford et al., 2009). Alexandridis and Singh (2016) show that a primary source of financing M&As in the shipping industry stems from borrowings. Consistent with highly levered firms being more constrained in raising additional funds (Myers, 1977; Harford et al., 2009; Martynova and Renneboog, 2009; DeAngelo et al., 2011), the degree of financial leverage has been identified as an important driver of inorganic corporate investment (Uysal, 2011). Since M&As have directly measurable outcomes and constitute an increasingly important corporate growth vehicle for shipping companies, they provide a fruitful testing ground to examine the impact of financial leverage on shipping companies' corporate investment decisions and their outcomes.

[1] The figures are estimated by using data from Compustat Global for firms that operate within the ship-owning, port, logistics and shipping services sectors.

[2] "Key developments and growth in global ship-finance", Petrofin Global Bank Research, September 2018.
"European banks struggle to solve toxic shipping debt problem", Reuters, 24 July 2017.

[3] The figure has been estimated using M&A data from Thomson SDC and includes all mergers and acquisitions that took place in the shipping industry over the period between 2008 and 2018.

To this end, we employ a comprehensive sample comprising 542 firms, 6,695 firm-year observations and 535 acquisition deals in the ship-owning, port, logistics and shipping services sectors for the period 1990-2018.[4] We compute *abnormal leverage* using a two-step estimation procedure, which involves first gauging the target leverage for a given firm based on a number of factors and then take the leverage deviation from its target leverage (see Uysal, 2011; Hovakimian et al., 2001).[5] Shipping companies aiming at growing their asset base should be expected to actively adhere to an optimal capital structure and avoid deviations from their target (Drobetz et al., 2013). Our findings corroborate this, although we also document marginally larger extremes in abnormal leverage compared to the overall market as captured in Uysal's (2011) study.

We first investigate whether abnormal debt levels can affect the decision to pursue an acquisition. Consistent with our hypothesis we find a negative relationship between excess leverage in shipping companies and the likelihood to consummate M&As. The magnitude of the effect is not negligible; one standard deviation increase in abnormal leverage results in a 98 basis points decrease of the probability to pursue an M&A deal, which is 38 basis points larger than the one reported by Uysal (2011) for the entire market. We also investigate whether excessive leverage has an impact on deal size as well as the acquisition financing mode. We find that a one standard deviation increase in acquirer excess leverage decreases deal size by $51mil and the probability of paying for a deal with cash by 779 basis points, which is three times more pronounced than the effect reported the entire market by Uysal (2011).

Finally, debt has been shown to exert a disciplinary effect on corporate investment by mitigating the agency cost of financial flexibility, which has been linked to the management team pursuing value decreasing projects (Jensen and Meckling, 1976, Harris and Raviv, 1991 and Grossman and Hart, 1982). Accordingly, we expect that acquisitions by overleveraged (underleveraged) shipping firms can be more (less) favourably perceived by the market. Consistent with our conjecture, we find that an increase of one standard deviation in abnormal leverage increases the cumulative abnormal return to the acquiring firm around the acquisition announcement by 90 basis points, corresponding to a $6.33mil gain for the average acquirer in our sample. This result corroborates the role of debt as an effective internal control mechanism; financially restricted firms are incentivised to focus on the most profitable investment opportunities and are, thus, more cautious in selection of acquisition targets.

Our study contributes to the general corporate finance and shipping finance literature in the following ways. First, it establishes that the impact of financial leverage on corporate investment decisions is more pronounced in sectors with higher financial distress costs such as the shipping industry. This can be attributed to the high cash flow volatility and degree of financial leverage in the sector as well as its capital-intensive nature, which can hamper profitability when a firm is forced to forgo valuable growth opportunities. Second, beyond shipping firms following a target capital structure (Drobetz et al., 2013), we

[4] In our initial tests we include both shipping services and the logistics sector, since they are still within the 26th percentile across all industries in terms of capital expenditures scaled by total assets. Excluding these subsectors from our analysis leave the direction of our results and key conclusions unchanged as discussed in the robustness section

[5] Following the literature negative values of abnormal leverage are linked to underleveraged firms and positive values are associated with overleveraged firms (see Uysal, 2011; Harford et al., 2009).

establish for the first time an important link between corporate financing and investment decisions in the shipping industry. The fact that higher debt levels are shown to have a negative effect on acquisitiveness and a positive effect on the quality of corporate investment has direct policy implications for shipping companies, their management teams and shareholders, especially for firms with inorganic investment plans in place. A key implication is that financial flexibility should not be viewed as panacea by corporate boards in the shipping industry since it can in fact be detrimental for a firm's investment choices and shareholder value. The significance of the study is also underpinned by the fact that consolidation in the shipping industry has become a popular path toward simultaneously delivering corporate growth as well as a lower degree of market fragmentation. Existing literature on acquisitions in the shipping industry (see e.g. Alexandrou et al., 2013; Alexandridis and Singh 2016) has documented evidence that specific deal and firm characteristics can affect acquisition outcomes. To our knowledge, this is the first study documenting a link between financial leverage and important acquisition characteristics such as the financing mode of a deal, as well as value creation from M&As in the shipping industry. Accordingly, a significant contribution stems from our finding that excess leverage can have a value enhancing role in the shipping industry through its influence on the quality of inorganic investment decisions.

The rest of the paper is organized as follows: Section 2 reviews the related literature and sets our hypotheses. Section 3 presents the data and empirical analysis. Section 4 reports results and discuss the findings. Section 5 discusses the robustness tests. Section 6 concludes the paper.

2. Related Literature and Hypotheses Development

2.1 Theories of corporate financing choice

One of the main objectives of corporate financing policy is to preserve financial flexibility (Graham and Harvey, 2001). Financing policies tend to be in line with the aim of securing capital funding for investment in a system where financing frictions can inhibit a company's ability to undertake profitable investment projects (Almeida and Campello, 2010). In a world where financing frictions are negligible, companies can finance all positive net present value projects by accessing the capital markets (Miller and Modigliani, 1958, 1963). Yet, frictions, such as information asymmetry and distress costs, can limit the capacity of companies to issue more capital. For instance, Bessler et al. (2011) report a negative relationship between information asymmetry and the probability of issuing equity. Lack of financing can lead to missed growth opportunities and, subsequently, to a vicious circle of financing restrictions and distress costs. Therefore, companies aim to adopt an optimal level of debt in their capital structure in order to avoid spiralling financing costs.

The corporate finance literature provides three alternative theories to explain capital structure dynamics. First, the trade-off theory postulates that companies set their capital structure as a function of the costs and benefits of debt (Kraus and Litzenberger, 1973). This theory implies that the decision of raising debt aims at upholding the optimal leverage ratio for the firm. Second, the theory of pecking order (Donaldson, 1961; Myers and Majluf, 1984) posits that companies prioritise their financing sources based on the cost

of financing, which tends to increase with asymmetric information. Accordingly, the prediction is that internal financing is used first, then debt, followed by equity only as a last resort. Finally, the market timing theory assumes that firms set their capital structure mix by opting for financing methods which maximise shareholder value (Baker and Wurgler, 2002). The market timing theory advodcates that the time-varying fluctuations of equity valuations provide incentives for firms to opt for equity capital when equity valuations are favourable and, similarly, opt for debt capital when the cost of debt is relatively low.

Deviation from the optimal capital structure has been shown to negatively affect company value. This is one of the main predictions of the "trade-off" theory; companies that maintain leverage close to optimal levels are more likely to maximise shareholder value (Modigliani and Miller, 1958; Myers 1977). Conversely, companies that fail to adhere to optimal leverage levels face adversities such as higher financing costs and insolvency. Since the executive team sets the capital structure policy, deviations from optimal leverage are considered signs of managerial inefficiency (Agyei-Boapeah et al., 2018). In other words, efficient managers that are focused on the long-term value maximisation objective are expected to minimise financing costs by adopting to an optimal (target) capital structure.

Financial risks are not exclusive to overleveraged companies, since extremely conservative or aggressive debt policies can decrease a firm's debt capacity (Myers, 1977). On one hand, overleveraged firms face the direct financial costs of failing to serve their debt, as well as other indirect costs, such as operational disruptions from retracted credit lines and business partners. On the other hand, underleveraged firms are exposed to the risk of missed growth opportunities due to underinvestment and managerial conservatism (Van Bins et al., 2010), leading to a competitive disadvantage. It is worth noting that overleveraged firms can also forego growth opportunities due to financing restrictions (see e.g. Kayhan and Titman, 2007). While both over- and under-leverage can lead to a firm entering an adverse feedback loop, impeding its growth potential and compromising its financing capacity (Shenoy and Koch, 1996), the cost of overleverage is shown to be more pronounced than that of under-leverage (Van Bins et al., 2010).

2.2 Financing choice in the Shipping Industry

Among the studies focusing on the capital structure of shipping companies, Drobetz et al. (2013) show that shipping firms consider a set of firm-specific factors when setting a target capital structure. Their study demonstrates that the standard drivers of capital structure play a more pronounced role in the shipping industry relative to other sectors. They find a positive relationship between asset tangibility and leverage, which they attribute to the fact that tangible assets, can be more easily liquidated to compensate creditors in the case of bankruptcy. They also find that profitability, asset risk, and operating leverage are inversely associated with the financial leverage and that shipping companies adjustment their capital structures more rapidly than non-shipping companies. This is an intuitive outcome in light of the evidence in the general corporate finance literature that the larger the magnitude of overleverage, the higher the speed of leverage adjustment (Flannery and Rangan, 2006).

The relationship between capital structure and its drivers can be affected by different market conditions during the various stages of the business cycle. For instance, Merika et al. (2015) investigate 117 publicly listed shipping companies and report a negative relationship between profitability and leverage following

the 2008 crisis. The study corroborates that company size, asset tangibility, and corporate performance are prominent determinants of the financing choice. In addition, Drobetz et al. (2016) examine the link between unexpected cash flow changes and financing choices in different market conditions. They find that the financing decisions of shipping companies are more sensitive to cash flow volatility relative to the manufacturing sector due to the high asset-value fluctuations in the sector. Nevertheless, they document that financially weak shipping companies tend to experience constraints in issuing long-term debt regardless of the economic environment, whereas their financially sound peers were able to raise debt even in the aftermath of the 2008 crisis. This suggests that despite the market-wide impact of a crisis, corporate financing policy is primarily affected by idiosyncratic firm characteristics.

2.3 Inorganic investment and financing choice

Debt capacity and financial flexibility are important for organic growth and they have been shown to drive inorganic investments, such as M&As. Typically, acquisitions are sizable investments involving a substantial amount of capital that is frequently sourced through external funding (see e.g., Moeller et al., 2004; Bharadwaj and Shivdasani, 2003). The extant literature has identified a number of M&A financing method determinants. For instance, Faccio and Masulis (2005) report a positive (negative) relationship between financial leverage (asset tangibility) and the share of cash in the financing mix. In a similar vein, acquirers with low spare debt capacity prior to a deal are more prone to use equity financing (Martynova and Renneboog, 2009) and less likely to offer cash as part of the deal consideration (Hu and Yang, 2016; Harford et al., 2009). Financing restrictions have also been shown to negatively affect the acquisitiveness of companies, as well as limit the size of the deals pursued (Uysal, 2011). Further, companies may be able to issue debt faster than equity, which suggests spare debt capacity can entail a strategic advantage when the deal completion timing is an issue (see e.g. Dikova et al., 2010; Agyei-Boapeah et al., 2018).

Corporate governance related issues can also affect the financing choice. Acquirers with concentrated ownership structure may decide to use debt financing in deal-making in order to maintain the ownership status quo (Amihud et al., 1990). This ownership-based dilemma is more pronounced for high-growth firms, where dilution of ownership can lead to existing shareholders foregoing considerable future value (McConnell and Servaes, 1990). The M&A financing choice can also be driving shareholder wealth creation considerations. For instance, stock-financed acquisitions have historically been associated with negative abnormal returns for acquirer shareholders (see e.g., Travlos, 1987), while unsustainable debt levels resulting from an acquisition can also destroy acquirer shareholder value (Harrison et al., 2014). Overall, there is ample evidence that capital structure policy can affect deal financing decisions and outcomes.

Another strand of literature has examined the impact of deviations from target leverage on inorganic investments. When companies are unable to fund sizable investments with internal funds, they are left with the choice of raising debt or issuing equity. The relationship between financing constraints and M&As decisions has been examined by corporate finance studies. Harford et al. (2009) show that overleveraged companies tend to use less cash in M&As deals. In a more comprehensive study, Uysal (2011) investigates the impact of deviations from target leverage on M&As decisions. He finds that

overleveraged firms are less likely to make acquisitions and tend to acquire smaller targets and use less cash in the financing. Overall, these studies point to a negative association between excess leverage and the firm's ability to execute its inorganic investment plans as well as its ability to fund these projects with debt.

2.4 M&As in the Shipping Industry

In more recent years, inorganic investment in the form of Mergers & Acquisitions (M&As) has gained pace becoming a fundamental source of growth for shipping companies. As a result, there is also a growing body of literature examining M&As in the shipping industry. These studies have predominantly focused on either the drivers and motives behind shipping M&As (see Brooks and Ritchie, 2006; Midoro and Pitto, 2000; Heaver et al., 2000; Das, 2011; Fusillo, 2009; Alexandridis and Singh, 2016) or their economic outcomes (see Panayides and Gong, 2002; Syriopoulos and Theotokas, 2007; Samitas and Kenourgios, 2007; Merikas et al., 2013; Choi and Yoshida, 2013; Darkow et al., 2008; Andreou et al., 2012; Alexandrou et al., 2014). A common finding among the literature is that acquiring firms aim at capitalising on operational and financial synergies, such as economies of scale, as well as from increasing their market share. Further, it has been shown that shipping M&As create value for both target and acquirer shareholders, while the bulk of the gains tend to be captured by target companies. The literature has pointed to specific deal and firm characteristics as key drivers of Shipping M&As. Alexandrou et al. (2014) examine the most comprehensive sample covering 1266 M&A deals in the shipping industry and report that cumulative abnormal returns (CARs) for acquiring firms are higher in domestic, all-cash and diversifying deals as well as when the acquisition involves a public target. Table 1 provides a summary of the samples and findings of key studies in the shipping M&A literature. Despite the link between capital structure and M&A outcomes, existing literature has not examined their relationship in the context of the shipping industry.

[Insert Table 1 here]

2.5 Hypotheses development

Although the literature has provided some valuable insights on M&As and their economic and financial implications, to the best of our knowledge, there is no study that investigates the connection between capital structure decisions and M&A choices in the shipping industry. Deviations from target leverage and their impact on inorganic growth are expected to be particularly important for firms in the shipping industry for at least the following reasons. First, the high capital intensity (CAPEX-to-Assets ratio of 8.3% in our sample) and reliance on debt financing (more than 80% of ship financing in 2017 was through bonds and loans (Alexandridis et al., 2018)) suggest that the success of a shipping company is highly sensitive to its debt policy and that deviations from target capital structure can lead to a high cost of financial distress.[6] Second, the withdrawal of a number of traditional financing players from the market due to the heightened volatility in freight rates and asset prices has led to a financially constrained environment for shipping firms, with significant implications for availability of financing for capital investments. Third, due to an oversupplied, fragmented market, consolidation in the shipping industry has

[6] See Appendix B for a graph depicting the capital intensity of the shipping industry against Compustat Global and North America deciles.

been at an ultimate peak with over $132.3bil invested in M&As during the past 5 years, a large portion of which tends to be financed with debt. Since the average investment required for an acquisition deal is typically larger than the amount required to undertake a single organic investment, the M&A market provides a fruitful testing ground to examine the impact of leverage deviations on firm investment.

Accordingly, an overleveraged shipping firm is expected to face stronger headwinds in raising debt to finance its inorganic investment plans since the likelihood that it becomes insolvent is higher than in other markets. Such adverse scenario could deter creditors from financing shipping deals, and thus highly levered shipping companies should be less likely to consummate acquisitions. Conversely, companies that have undershot their target leverage can be expected to have more access to debt financing, hence being better placed to take advantage of the fast-paced rate of consolidation in the shipping industry to improve their competitiveness. Accordingly, we formulate our first hypothesis:

H1. There is a negative relationship between abnormal leverage and the probability of a firm undertaking an acquisition.

If financial leverage can influence a company's ability to undertake acquisition investments, then it should also affect the size of investments it pursues. Overleveraged acquirers are restricted by their capacity to issue any type of capital. In the case of debt issuance, they may be restricted by debt covenants (Daher and Ismail, 2018) or unwillingness of creditors to provide capital to a company with significant fixed obligations. In the case of equity issuance, investors may require steep discounts when buying into the company in order to increase the expected value of their share in a highly leveraged firm. In both cases, acquirer managers are restricted in the amount of capital they can raise, rendering the pursuit of large investments challenging. Due to these financial frictions, acquirers with excess leverage are expected to conduct smaller deals (see e.g. Uysal, 2011). Given the idiosyncrasies of the shipping industry and the more restricted financing environment, the adverse effect of overleverage on the size of investments could be more pronounced in this case. Conversely, underleveraged acquirers may be better positioned to tap into the limited capital provided by creditors in the shipping market, therefore being less restricted in pursuing larger acquisitions. The fact that the average shipping M&A deal has increased in size by 14.20% during the last 5 years, makes this an interesting angle to examine.

This leads us to our second hypothesis:

H2. There is a negative relationship between acquirer abnormal leverage and deal size.

Departures from the optimal capital structure can also affect financing decisions. Overleveraged acquirers are less likely to utilise pure cash in the payment consideration (Uysal, 2011), since cash deals are frequently financed with issuance of debt (see e.g. Khoo et al., 2017). Conversely, higher debt levels in the capital structure lead to more equity in the payment mix (see e.g., Faccio and Masulis, 2005; Martynova and Renneboog, 2009). The restrictive financing environment in the shipping industry has led to a wave of stock-for-shock or ships-to-stock deals during the last few years. Thus, the question of whether deviations from optimal leverage can have an impact on financing choices becomes central, especially given the evidence pointing to more favourable M&A outcomes in cash deals. Along these

lines, acquirer returns are typically higher for cash deals (Gorbenko and Malenko, 2017), while stock offers have been linked to losses for acquirers (see e.g. Moeller et al., 2005). In the shipping industry, cash deals have been shown to outperform stock deals (Alexandrou et al., 2014). For the reasons above, we conjecture that a shipping firm's capital structure will have an impact on the M&A financing method. Accordingly, we formulate the following hypothesis:

H3. There is a negative relationship between abnormal leverage and the probability of an acquirer utilising cash in the acquisition offer.

Leverage has been advocated as an effective passive internal control mechanism that can help alleviate agency costs by incentivising management to make decisions in favour of shareholder value (see e.g., Jiraporn and Gleason, 2007). On one hand, firms with sizable debt obligations have a higher cost of capital, while an unexpected change in their profitability could also lead to a failure of servicing their debt and push them closer to insolvency. In such circumstances, the executive team has more of an incentive to adopt corporate policies that will maximise firm value, since any value destroying projects can pose an existential threat for the company. On the other hand, firms with spare debt capacity or free cash flow are shown to be more prone to pursuing self-serving investments that can ultimately be detrimental for shareholders (Jensen, 1986). Along these lines, the literature has pointed to a positive relationship between financial leverage and the quality of corporate investment decisions (Uysal, 2011; Hu and Yang, 2016). The reliance on debt financing and prevalence of cash flow volatility in the shipping industry can potentially increase the financial distress costs from having excessive leverage in the balance sheet, which can in turn induce more managerial restraint in inorganic investment choices and deter overinvestment. Accordingly, we formulate the following hypothesis:

H4. There is a positive relationship between abnormal leverage and acquirer stock performance around the deal announcement date.

3. Data and Empirical Methodology

Our sample includes internationally listed shipping companies from Compustat Global and North America and spans the period 1990 to 2018. We focus on the shipping subsectors of deep-sea freight transportation, offshore business, passenger shipping, cruise lines, port business, and logistics and shipping services, with SIC codes between 4400 and 4412.[7] There are 627 firms that meet these criteria corresponding to 8,915 firm-year observations. We drop 1,212 firm-year observations with sales of less than $10mil and where companies have missing data for variables used for the estimation of abnormal market leverage. The final dataset used in the abnormal leverage tests comprises 542 firms and 6,695 firm-year observations. We also collect M&A deal data from the SDC M&A Database for transactions with deal value of $1mil or more. We exclude spin-offs, recapitalisations, self-tenders, exchange offers, and repurchases. Of the 542 firms in our sample, 222 consummated 535 M&A deals during our sample period. Acquirers are listed companies from 48 stock markets with the U.S. comprising 15% of the whole sample, followed by

[7] The allocation of companies to the different subsectors has been performed manually by advising the "S&P Business Description" variable in Compustat and, complementary, the companies' website.

acquirers from Norway (9%) and Japan (8.5%). Around 42% of the deals are cross-border, 20% of the deals are financed with pure cash and in 85% of the cases the target company is a private firm.

The task of gauging target leverage for the companies in our sample is hindered by the fact that the actual leverage target set by a company's management is unobservable to outsiders. In order to address this issue, previous studies have utilised alternative proxy estimates of leverage targets, including the historical average leverage ratio, the industry median leverage ratio, or a fitted leverage estimate (see e.g., Hovakimian, 2004; Shyam-Sunder and Myers, 1999). Since, median industry leverage does not necessarily account for company-specific idiosyncrasies, we follow Kayhan and Titman (2007), Harford et al. (2009), and Uysal (2011) and employ a fitted leverage estimation as our primary method. Along these lines, we, estimate the target leverage ratio by running annual cross-sectional regressions of leverage ratios on key determinants of capital structure.[8] We define abnormal leverage as the difference between the actual and fitted leverage values, which we obtain from the capital structure regressions.

We follow existing literature and employ market leverage as our leverage measure since it tends to incorporate the updated market view on company value and growth opportunities. Along these lines, Harford et al. (2009) focus on market leverage instead of book leverage since most of the theoretical predictions related to leverage are made with respect to market leverage. Borio (1990) also argues that economists typically employ market leverage as it is forward-looking. Indeed, book-leverage might be seen as backward looking, not necessarily reflecting a company's financial health and debt capacity with respect to current market conditions. Welch (2004) suggests that the book value of equity is just a "plug number" that helps balancing the two sides of the balance sheet. In fact, the book value of a company can even be negative, which may lead to measurement problems. Accordingly, Mittoo and Zhang (2008), Harford et al. (2009), Uysal (2011), Morellec and Zhdanov (2008), Agyei-Boapeah et al. (2018), and Ahmed and Elshandidy (2018), amongst others, all employ market leverage as their measure of leverage deviation. Along these lines, we define market leverage as the ratio of long- and short-term debt to the market value of assets (Frank and Goyal, 2009; Drobetz et al., 2013).

We follow previous studies (see e.g., Fama and French, 2002; Uysal, 2011) in employing a two-step estimation process. First, we estimate the target capital structure by running annual cross-sectional fractional response regressions of market leverage on the determinants of capital structure. We define the target leverage ratio as the fitted value of the regression (Equation 1). Abnormal leverage variable is then the actual leverage ratio minus the target leverage ratio (Equation 2).

$$Leverage_{i.t} = \alpha + \boldsymbol{\beta X}_{i,t-1} + e_{i,t} \quad \text{(Eq. 1)}$$

$$Abnormal\ Leverage_{i,t} = Actual\ Leverage_{i,t} - Predicted\ Leverage_{i,t} \quad \text{(Eq. 2)}$$

Empirical capital structure studies, typically investigate the properties of leverage ratios by utilising ordinary least square regression models. Since leverage is defined as total debt over total debt plus equity,

[8] We follow the methodology of Harford et al. (2009) and Uysal (2011), who estimate target capital structure by running annual cross-sectional regressions. This method is considered superior than the pooled regression method at capturing the time-varying impact of control variables on leverage ratios. Our results remain the same when we use the pooled regression method.

the leverage ratio is strictly bounded within the range [0. 1]. Since the predicted values of the dependent variables in OLS cannot be restricted within the same interval [0, 1], the OLS estimator is not necessarily an appropriate model for the estimation of target leverage (Ramalho and Silva, 2011). To highlight the issues that can arise with the use of the OLS estimator further, assume an 1 x K vector of independent variables that explain a dependent variable, y, which lies between zero and one:

$$E(y|x) = \beta_1 + \beta_2 x_2 + \cdots + \beta_k x_k = x\beta \quad \text{(Eq. 3)}$$

where β is a 1 x K vector that may not reflect the true properties of $E(y|x)$, such as the restriction that the leverage variable can be defined only within the interval [0, 1] in our case. This is due to the fact that there can be non-linear relationships between the explanatory variables and the dependent variable. Papke and Wooldridge (1996) argue that this drawback can be surpassed by modelling the log-odds ratio as a linear function, as long as y does not take value of zero or one:

$$E\left(\log\left[\frac{y}{1-y}\right]\middle|x\right) = x\beta \quad \text{(Eq. 4)}$$

The reason this approach might not seem appropriate in our case is that there are a number of firms with null leverage ratios, i.e., some companies have zero outstanding debt in a given year, as shown in Figure 1. To overcome the issues that might arise using Equation 4, Papke and Wooldridge (1996) develop a fractional response model (Equation 5) to cope with bounded dependent variables:

$$E(y|x) = G(x\beta) \quad \text{(Eq. 5)}$$

where $G(\cdot)$ is a function satisfying the requirement that predicted values lie in the unit interval. The logistic function, $G(x\beta) = e^{x\beta}/(1 + e^{x\beta})$, and the probit function, $G(x\beta) = \phi(x\beta)$, are the two most popular options employed in the literature (see e.g., Cook et al., 2008, Ramalho and Da Silva, 2009). The estimation procedure proposed by Papke and Wooldridge (1996) is a quasi-likelihood method which involves the estimation of β in Equation 5 by maximising the Bernoulli log-likelihood function:

$$l_i = y_i \log[G(x_i\beta)] + (1 - y_i)\log[1 - G(x_i\beta)] \quad \text{(Eq. 6)}$$

Since Bernoulli log-likelihood function (Equation 6) is a linear exponential family member, the quasi-maximum likelihood estimator of β will always be consistent (see Gourieroux et al. (1984) for a detailed discussion). Accordingly, we use the following model to run the capital structure regressions:

$$E\left(ML_{i,t}\middle|X_{i,t-1}\right) = G(X_{i,t-1}\beta) \quad \text{(Eq. 7)}$$

where ML_{it} denotes the market leverage of a company i at year t, $X_{i,t-1}$ (the 1 x k vector) refers to the explanatory variables of observation i measured at $t-1$. $G(\cdot)$ is the logistic function fulfilling $0 \leq G(z) \leq 1 \ \forall z \in \mathbb{R}$, which satisfies the requirement that the predicted values lie within the unit interval.

[Insert Figure 1 here]

We identify a set of determinants that have been shown to affect firm financing decisions. Following Harford et al. (2009) we measure the explanatory variables in year $t-1$. We include asset tangibility as a measure of a company's ability to provide collateral for the issuance of debt. Companies with high tangibility can use more debt financing since tangible assets can be used as collateral for bank loans (Jensen and Meckling, 1976). In addition, Hovakimian et al. (2001) show that firms with more tangible assets tend to be larger with a lower bankruptcy risk. As Drobetz et al. (2013) note, the association between asset tangibility and financial leverage falls within the predictions of the trade-off theory.

Trade-off theory also predicts a positive relationship between profitability and financial leverage since higher profit levels can cater towards servicing of larger debt payments. Yet, pecking order theory counter-argues that more profitable companies are able to use internal funds for capital investment, therefore predicting a negative association between profitability and financial leverage.

Similarly, there is no consensus over the role of company size on financial leverage. The trade-off theory predicts a positive relationship between size and financial leverage as larger companies tend to be more diversified and have a lower probability of default. On the other hand, the pecking order theory points to a negative relationship between company size and leverage since information asymmetry is less of an issue for large companies, thus leading to more frequent use of equity in place of debt capital.

We also include the market-to-book ratio as a proxy for growth opportunities. The trade-off theory predicts an inverse relation between growth opportunities and financial leverage since growth firms tend to be subject to higher financial distress costs as well as higher agency costs due to potential underinvestment problems (Myers, 1977; Drobetz et al., 2013). Conversely, the pecking order theory predicts a positive relationship between growth opportunities and leverage since companies are more likely to borrow beyond their debt capacity during periods of high growth opportunities when internally generated cash flow is not sufficient (Baker and Wurgler, 2002). We also include the stock return since companies may choose to rely on equity issues and raise little debt under favourable stock market conditions (Baker and Wurgler, 2002), which suggests a negative relationship between stock return and financial leverage.

In addition to the standard capital structure variables, we introduce a set of additional control variables that may have an impact on shipping companies' capital structure decisions (Drobetz et al., 2013). Companies with more volatile asset values may be able to issue less secured debt. Therefore, we include an asset risk variable in our regression. Moreover, the trade-off theory predicts an inverse association between asset risk and financial leverage because of higher expected bankruptcy costs for companies with riskier assets. Following Kahl et al. (2011), we also include operating leverage as a proxy of fixed production costs. Higher operating leverage increases the company's exposure to the business cycle. Therefore, we expect companies with higher operating leverage to have lower levels of financial leverage. Further, companies paying dividends tend to have lower financial leverage as dividend payments decrease the net cash flow, leading companies to resort to external financing for their operating needs (Frank and Goyal, 2009). Lemmon et al. (2008) find that an unobserved time-invariant effect drives most of the variation in leverage levels, which, can in turn, lead to relatively stable capital structures. Accordingly, we include one year lagged market leverage to control for the unobserved time invariant firm effects (see

also Baker and Wurgler (2002); Uysal (2011); Hu and Yang (2016)). We also include subsector dummies in all cross-sectional regressions to control for the variation in company characteristics among subsectors.

Table 2 reports the descriptive statistics for our sample. Market leverage has an average of 0.47 and a standard deviation of 0.27. The relatively high standard deviation points to a wide variation in capital structures in the shipping industry. This variability can be attributed to the idiosyncratic characteristics of each company, which are the key drivers of their capital structure, according to the trade-off and pecking order theories. A direct implication of this is that some under-leveraged or over-leveraged companies in our sample can display similar leverage ratios. Abnormal leverage is almost zero on average but with a relatively high standard deviation. This suggests that, while the average company follows a target capital structure, some firms deviate from their capital structure targets. We also see that 61% of the typical firm's assets are tangible, while for the most capital-intensive firms, asset tangibility can exceed 90%. The average Market-to-Book ratio of 0.60 is lower than the ratios reported in other shipping studies (Alexandrou et al., 2014; Drobetz et al., 2016). This could be attributed to the sample differences with respect to the shipping subsectors and time periods examined. For instance, the offshore business is associated with lower market-to-book ratios relative to other subsectors over the sample period. Further, the market-to-book ratio is lower during 2011- 2018, which is a period not included in the aformentioned studies.

[Insert Table 2 here]

We test the effect of abnormal leverage on shipping companies' acquisitiveness by employing a probit model as in Uysal (2011), where the dependent variable is binary and takes the value of 1 if a company undertakes at least one acquisition in year t and 0 otherwise (H1). The model is as follows:

$$P_{it}(Acquirer = 1) = \phi(\alpha_{10} + \alpha_{11} Abnormal\ Leverage_{i,t-1} + \alpha_{12} Z_{i,t-1}) \quad \text{(Eq. 8)}$$

where $P_{it}(Acquirer = 1)$ is the probability of firm i being an acquirer in year t. ϕ is the probit function, i.e., the inverse cumulative distribution function of the standard normal distribution. Abnormal leverage is a continuous variable defined as the difference between actual and predicted leverage. The αs represent the intercept (α_{10}), the coefficients for the abnormal leverage variable (α_{11}), and the vector of coefficients for the control variables (α_{12}).

We also investigate the impact of abnormal leverage on the size of acquisition deals completed by the acquiring firms in our sample, since higher leverage levels can hamper a firm's ability to raise sufficient funds to undertake large acquisitions (H2):

$$Log(Deal\ Value)_{it} = \alpha_{20} + \alpha_{21} Abnormal\ Leverage_{i,t-1} + \alpha_{22} Z_{i,t-1} + \varepsilon_{23} \quad \text{(Eq. 9)}$$

Next, we investigate if abnormal leverage has an impact on the probability of making a deal financed with pure cash (H3):

$$P_{it}(All\ Cash = 1) = \phi(\alpha_{30} + \alpha_{31} Abnormal\ Leverage_{i,t-1} + \alpha_{32} Z_{i,t-1} + \varepsilon_{33}) \quad \text{(Eq. 10)}$$

Where $P_{it}(All\ Cash = 1)$ is the probability of firm i undertaking a deal financed only with cash consideration, i.e., 100% cash.

Finally, we test if abnormal leverage has an impact on acquisition gains (CARs) around acquisition announcements (H4). CARs are estimated for a 5-day announcement window (-2,+2) using the standard market model (Brown and Warner, 1985). The parameters of the model are estimated from day -255 to day -45 relative to the deal announcement day.

$$CAR_{it} = \alpha_{40} + \alpha_{41} Abnormal\ Leverage_{i,t-1} + \alpha_{42} Z_{i,t-1} + \varepsilon_{43} \quad \text{(Eq. 11)}$$

The control variables in Equations 8 to 11 are company- and sector-specific characteristics that have been shown to affect the response variables. We include a company profitability variable to account for the accounting performance of companies, since better performing firms tend to execute more acquisitions (Harford, 1999). Large firms are also more likely to pursue more acquisitions as it is easier for them to tap into the capital markets for external financing (Moeller et al., 2004 and Uysal, 2011). Accordingly, we include a size variable defined as the natural logarithm of total assets. We also include stock returns since companies with superior stock performance can resort to acquisitions to support their fast-paced growth (Shleifer and Vishny, 2013). In addition, they may have better access to inexpensive equity capital, which could in turn facilitate deal-making. We include cash ratio to account for companies holding more cash being more acquisitive (Jensen, 1986). We use market-to-book ratio in order to control for growth opportunities (Jovanovic and Rousseau, 2002). We use capital expenditures-to-total assets ratio to account for internal growth (Harford et al., 2008). Further, Uysal (2011) argues that a concentrated market offers less alternatives for mergers. Along these lines, we include the Herfindahl-Hirschman Index as a proxy for market concentration for each subsector. To control for M&As waves and market liquidity, we include industry M&A liquidity for six subsectors in our sample (Schlingemann et al., 2002). Since high levels of leverage does not necessarily indicate extreme overleveraging, to disentangle the impact of abnormal leverage from normal levels, we include average market leverage. We also include relative size since acquirer returns have been shown to increase with relative size (Masulis et al., 2007) while the probability of undertaking an acquisition with cash decreases for larger deals (Faccio and Masulis, 2005)

In some specifications we also include deal-specific characteristics to control for the impact of target public status and target business segments.[9] In the acquisition probability models, we include asset intangibility to control for the impact of brand name, reputation, and the capability to share experience on shipping M&As. Along these lines, it has been argued that a company's intangible capital may create synergistic benefits through transfers of knowledge and experience (Huyghebaert and Luypaert, 2010) while Drobetz et al. (2019) show that the share of intangible assets in total assets has a significantly positive impact on market value and accounting performance. In equation 10, we include the standard deviation of the acquiring firm's daily stock return for the year prior to the acquisition announcement following Faccio and Masulis (2005) who argue that higher acquirer stock return volatility makes stock

[9] We would like to note that our sample size decreases steeply when attempting to include any other variables for public targets. Indicatively, we have 55 public-target deals out of a total of 267 acquisitions in some of our models, while further, target specific/accounting variables are only available for around half of these 55 cases. Yet, our study focuses on the leverage decisions of the acquiring firms, therefore, there is limited reason to expect that target-specific information is directly relevant.

financing more advantageous, due to the opportunity to take advantage of issuing overvalued stock. They also argue that higher stock return volatility can make cash financing through debt less beneficial due to the higher cost of debt in this case. Finally, we include year dummies to account for changes in the macroeconomic environment.[10]

4. Empirical Results

In this section, we present the main empirical results of our analysis. We first discuss the results of the capital structure regressions and the abnormal leverage variable. We then present the results from testing our four hypotheses.

4.1. Capital Structure Regressions

We estimate the target leverage ratio in two stages. We first run annual regressions of leverage ratios on key determinants of capital structure (see e.g. Frank and Goyal, 2003; Uysal, 2011). Then, we estimate the target leverage as the fitted value of leverage for each firm-year observation. Table 3 presents the results of the capital structure regressions for a number of selected years in our sample.

The reported marginal effects for the independent variables display similar direction to prior studies (Frank and Goyal, 2009; Drobetz et al., 2013). The magnitude of the coefficients, however, varies significantly over different selected years. Asset tangibility yields a positive coefficient in all reported years, while its impact becomes stronger in 2009 reflecting the significance of tangible assets for raising debt during unfavourable market conditions. Indicatively, in 2009, a one standard deviation increase in asset tangibility is associated with 236 basis points increase in the debt ratio. Profitability displays the opposite effect on market leverage, bearing negative coefficients across all specifications. Operating leverage shows mixed results, with a negative influence on market leverage in 2014 and 2015. Specifically, in 2015, we report that one standard deviation increase in operating leverage leads to 325 basis points decrease in market leverage.

[Insert Table 3 here]

The variable capturing asset risk provides mixed results, offering support for competing capital structure theories during different time periods. In 1997, a one standard deviation increase in asset risk is associated with 584 basis points increase in market leverage. This relationship is in line with the pecking order theory, which predicts that companies with more volatile asset values tend to use more debt due to higher adverse selection and information asymmetry costs. In contrast, following the 2008 financial crisis, we find a negative and significant association between asset risk and market leverage. This new relationship provides support for the trade-off theory, which predicts that companies with riskier assets are inclined to use less cash because of higher bankruptcy costs (Drobetz et al., 2013). Our results on the impact of dividend-payer status, size, and stock return variables are also mixed. The coefficient of the market-to-book ratio, which might capture both market valuation and growth opportunities, is consistently negative

[10] See the Robustness Tests section for the results with the shipping crisis dummy instead of separate year dummies.

over the years. This is in accordance with Myers (1977) predicting that companies with high growth opportunities are potentially exposed to higher cost of financial distress, and, thus, use less debt in their capital structure. The effect is economically significant. Indicatively, in 2015, a one standard deviation increase in the market-to-book ratio leads to a decrease of 608 basis points in market leverage. Finally, the coefficient of lagged market leverage is positive and statistically significant over the years, which is consistent with arguments that corporate capital structure has a stationary element (Lemmon et al., 2008; Baker and Wurgler, 2002; Uysal, 2011).

We estimate the target leverage for each firm-year observation by calculating the fitted leverage value using the regressions in Table 3. We then compute the abnormal leverage for each firm-year observation by subtracting each company's target leverage ratio from its market (actual) financial leverage ratio (see Eq. 2). Positive and negative abnormal leverage indicate over-leverage and under-leverage, respectively. Figure 2 shows the distribution of abnormal leverage for all firm-year observations in our sample. The slightly leptokurtic shape of the distribution indicates that the vast majority of shipping companies are successful at maintaining their market leverage close to optimal levels.

[Insert Figure 2 here]

Figure 3 shows the evolution of target and market leverage for both the aggregate ship-owning sector and the corresponding subsectors. Panel A in Figure 3 shows that, overall, companies are successful at maintaining their leverage ratios close to target levels, although market conditions can lead to shifts in their capital structure policy. For instance, while the median company is over-leveraged during the pre-crisis market boom period before 2008, the median company undershoots its optimal leverage after the crisis (Panel A). This shift in capital structure policy is consistent with the prediction of the trade-off theory that a company's target leverage is expected to be lower during higher market valuation periods (Drobetz et al., 2013). The various subsectors in our sample show more volatile movements for target and market leverage relative to our entire sample, but, overall, the median company has been successful at maintaining a market leverage close to target levels. This situation could be attributed to the pressure applied by banks and other creditors to shipping companies with respect to keeping their leverage ratios close to target levels (Drobetz et al., 2013).

[Insert Figure 3 here]

4.2. Acquisition Probability Models

The link between corporate investment and financing decisions is well established in the corporate finance literature. Accordingly, the inorganic investment strategy is often driven, among other factors, by the company's capital structure policy. In this section, we present the results of the acquisition probability model using abnormal leverage as a key predictor of acquisitiveness (H1). Table 4 presents various specifications of the acquisition probability model. The binary dependent variable takes the value 1 if the company has performed an acquisition in year t and 0 otherwise. Our findings are consistent with the prediction of our first hypothesis, i.e., the probability of a firm completing an acquisition decreases with

abnormal leverage. Column VI in Table 4 shows that abnormal leverage has negative and significant impact on the probability of a company being an acquirer after accounting for other known determinants of acquisition activity. We find that an increase of one standard deviation in abnormal leverage in the shipping industry decreases the probability of a company consummating an acquisition by 98 basis points, which is significantly more pronounced as the effect documented for the overall market (Uysal, 2011). This is indicative of the importance of leverage for shipping companies in devising corporate policy; the propensity to pursue inorganic investment among shipping firms is more responsive to deviations from optimal leverage, possibly due to the higher tendency of shipping firms to adhere to an optimal leverage target by rapidly adjusting their leverage ratios back to the target.

[Insert Table 4 here]

Several control variables are related to the propensity of a shipping company to engage in acquisitions. Size has a positive and significant effect on acquisitiveness in all models. In model VI, an increase of one standard deviation in size leads to an increase of 405 basis points in the probability of pursuing an acquisition, which is more than twice the effect reported for the overall market (Uysal, 2011). Further, the likelihood of undertaking acquisitions seems to be linked to a firm's profitability, though only in some specifications. Asset intangibility displays a positive and significant effect on acquisitiveness across all regressions. A possible explanation is that the larger a company's intangible asset base, the greater its ability to capture synergistic benefits from delivering knowledge to the target company (Huyghebaert and Luypaert, 2010). The Herfindahl-Hirschman Index (HHI), a measure of market concentration, is not a significant determinant of acquisition likelihood, which differs from the finding in Uysal (2011). This suggests that acquirers may pursue deals regardless of market concentration levels which could be attributed to the competitive nature of the shipping industry, where shipping companies seek to enhance their market power regardless of market conditions. On a similar note, the coefficient of M&A Liquidity is also insignificant, reiterating that the typical firm in our sample will devise their investment policy regardless of market conditions. The significant and negative coefficient of average market leverage in all configurations suggests an inverse relationship between acquisitiveness and historical leverage levels. This is consistent with the view that the acquisition likelihood can be driven by both, the leverage ratio and deviations from target leverage.

Overall, our findings are consistent with our hypothesis that the likelihood of a firm in the shipping industry making M&A investment decreases with abnormal leverage after controlling for several other important determinants of acquisitiveness.

4.3. Deal Size Models

We next examine whether deviations from target leverage can affect the selection of acquisition targets. We hypothesise (H2) that deal size decreases with abnormal leverage due to overleveraged acquiring firms opting for smaller targets and/or underleveraged ones pursuing larger deals. Table 5 reports the results of the deal size models. The results corroborate our expectations that deal size and abnormal leverage display a negative relationship. The magnitude of the effect is economically significant; a one standard deviation

increase in abnormal leverage is associated with a decrease of 2700 basis points in deal size, which corresponds to a $51mil reduction for the average deal.[11] The coefficients of our control variables are largely consistent with existing empirical literature. Growth opportunities, cash holdings, the method of payment, the target's public status all display significant association with deal size.

[Insert Table 5 here]

Our findings highlight the importance of capital structure decisions on corporate investment policy and are consistent with our hypothesis that deviations from target leverage have a negative impact on the size of consummated M&A deals.

4.4. Payment Method Models

According to our third hypothesis (H3), deviations from target leverage should affect the availability of debt financing for an acquisition deal and therefore the amount of cash in the payment consideration. The literature has shown that even for a firm with ample cash reserves, too much debt on its balance sheet can lead to less cash financing in order to maintain financial flexibility (Martin, 1996). Table 6 reports the results of payment method regressions on abnormal leverage and other controls. The results are consistent with the prediction that excess leverage affects the payment method in M&As. Specifically, a one standard deviation increase in abnormal leverage leads to a decrease of 779 basis points in the probability of using only cash consideration. This effect is significantly higher than the decrease of 247 basis points documented for the overall market (Uysal, 2011).

The coefficients of several control variables show occasionally inconclusive or insignificant results. Asset risk has a negative impact in all configurations, which echoes the findings of Faccio and Masulis (2005), pointing to a negative relationship between stock return volatility and cash consideration in M&A deals. Relative size is negative and significant in all configurations, implying that shipping companies are less likely to pay fully in cash, the larger the deal (Alexandridis et al., 2013; Faccio and Masulis, 2005). We also find evidence that the probability of using pure cash as a payment method decreases with higher growth opportunities or firm valuation as reflected in the market-to-book ratio. Average market leverage displays a negative relationship with the probability of paying with cash. This is consistent with our conjecture that over and above deviations from optimal leverage levels, debt-ridden companies may be restricted in using their cash reserves or raising more cash to finance an M&A deal via debt issuance. We also find that shipping companies are less likely to finance their cross-border deals with cash while the target public status has a positive and significant effect on payment method.

Overall, our analysis corroborates our hypothesis that the probability of utilising cash-financing in shipping M&As decreases with the acquirer's abnormal leverage.

[11] This is figure is based on the average deal size in our sample. See Table 2 for the full descriptive statistics.

[Insert Table 6 here]

4.5. Acquirer Return Models

Our analysis so far has established that a shipping company's financing policy captured in its abnormal leverage has a material impact on M&A decisions such as the likelihood to pursue a deal, the size of the deal, and the financing method. In this section, we examine whether deviations from target leverage ratios can affect deal outcomes and, in particular, their quality as measured by acquirer abnormal returns around the deal announcement. Table 7 reports the regressions of Cumulative Abnormal Returns (CARs) on abnormal leverage and other control variables.

[Insert Table 7 here]

Abnormal leverage has a positive effect on acquirer returns, though only statistically significant at the 10% level. Acquirer CARs increase by 90 basis points in response to an increase of one standard deviation in abnormal leverage. This increase translates into market capitalisation gains of $6.33mil for the average acquirer. The magnitude of the effect is economically important for acquiring shareholders, considering the typical deal in our sample increases shareholders' wealth by $6.87mil. This result provides support to the conjecture that debt has a disciplinary effect on corporate investment by mitigating the agency cost of financial flexibility (Jensen and Meckling, 1976, Harris and Raviv, 1991 and Grossman and Hart, 1982) leading to a focus on the most profitable investment opportunities and are more cautious in the selection of acquisition targets. Again, the effect of abnormal leverage on acquirer returns is three times more pronounced in shipping M&As relative to the overall market (Uysal, 2011).

The coefficients of several control variables such as relative size, market concentration, cross-border, public targets display mostly significant results which are consistent with much of the empirical literature. Table 7 shows that the market reaction for profitable shipping companies is positive, even though only configuration II reports statistical significance. Overall, after controling for a number of known acquirer return determinants we confirm our hypothesis that acquisition performance in the shipping industry increases with abnormal leverage.

5. Robustness Tests

In this section, we perform several additional tests to check the robustness of our results.[12] We begin by establishing that the forced turnover sample specification does not affect our main results. In particular, our sample comprises of six subsectors in the shipping industry including logistics and the shipping services, which we show to be less capital intensive than the pure ship-owning industry segments. Given that leverage is more of an issue for firms operating within more capital-intensive environments, which also forms part of the motivation of our paper, we re-run our test without the logistics and shipping services

[12] For brevity, these additional robustness results are not reported here but are available upon request.

industry. Adopting this alternative sample specification does not exert any significant change in our results.

Further, the literature has offered a number of alternative proxies for target leverage. Two frequently used alternatives to the fitted-value approach are the industry median leverage (see e.g., Hovakimian, 2004) and the 3-year mean leverage (see e.g., Shyam-Sunder and C. Myers, 1999). To check the robustness of our results, we re-run all tests by proxying for target leverage with both company average and median industry leverage and report very similar results with the original analysis.

Our results are also robust to alternative model functions. In addition to utilising a logit function in the fractional response model for the estimation of target leverage, we follow Papke and Wooldridge (1996), to test the sensitivity of our results to applying a probit function as an alternative discrete outcome function. We test the impact of the two alternative functions on the estimation of target leverage, acquisition probability, and all-cash probability models and find that it makes no difference.

In Table 4, we present the results of the annual cross-sectional capital structure regressions for selected years. In order to estimate abnormal leverage, we use the fitted values of individual regressions (target leverage) and subtract them from the market (actual) leverage. As a robustness check, we utilise a single pooled capital structure regression with year fixed effects to calculate the fitted values for the estimation of abnormal leverage and find that our results remain similar.

In the original analysis, we include year fixed effects in order to control for the possibility that target deviations measured in terms of market leverage being higher during market crisis periods. We follow Drobetz et al. (2016) and define three crisis periods in our sample: (i) 1990 to 1993, (ii) 2002-2003, (iii) 2008 to 2012.[13] Instead of the year fixed effects, we include a crisis dummy in the models capturing these three periods and our results remain very similar.

Finally, in our analysis we treat the impact of deviations from target leverage as symmetric, i.e., both positive (overleverage) and negative (underleverage) deviations from target leverage contribute equally to the negative relationship we document between abnormal leverage and the probability of undertaking an acquisition. The assumption, as highlighted in our hypotheses, is that the negative relationship between abnormal leverage and the likelihood of undertaking an acquisition could stem from both, inorganic investment restraint of overleveraged firms and the financial flexibility associated with underleveraged firms (in the spirit of the free cash flow hypothesis). We put this to test by examining potential non-linearities in the documented relationship. Accordingly, we split our sample in under- and over-leveraged firms, and examine the impact of absolute leverage deviations on acquisition probability. The relationship appears to be symmetric in the sense that the coefficients for over- and under-leveraged firms have a negative and positive sign respectively and are statistically significant (-0.217** and 0.125**, respectively). Yet, the impact of over-leverage on the overall relationship seems more pronounced.

[13] The sample of Drobetz et al. (2016) covers the period between 1989 and 2012. The results we report in the robustness tests with shipping crisis dummy are based on the years stated above. The results remain unchanged regardless of whether we define years 2013-2018 as crisis as or no crisis years.

6. Conclusion

In this paper, we provide evidence that shipping companies' capital structures can affect their corporate investment decisions and in particular mergers and acquisitions, an increasingly important corporate growth vehicle for shipping companies, with directly measurable outcomes. Our evidence corroborates the findings of previous studies that firms in the shipping industry tend to follow a target capital structure, although we also document cases with significant deviations from targets. We find that the probability of a shipping firm pursuing acquisition deals decreases with abnormal leverage, a measure of divergence from optimal leverage. We also document that the extent of cash financing and the deal size decrease with abnormal leverage, consistent with our hypotheses that overleverage can impede the firm's ability to borrow further in order to finance M&A deals. Further, we document that the more overleveraged a firm, the better its acquisition deals are perceived by the market, in-line with the conjecture that the disciplinary role of debt reduces the associated agency cost, leading to superior investment decisions. The effects we document are more pronounced for the shipping industry relative to the previous findings for the overall market, which can be attributed to its idiosyncratic characteristics. Our findings have direct policy implications for shipping companies, their management teams and shareholders, and especially for firms with inorganic investment plans in place.

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Table 1. *Summary of studies focusing on the economic implications of M&As in the shipping industry.*

Study	Sample characteristics	Key findings
Panayides and Gong (2002)	Two deals in the liner segment between 1995 and 1999.	CARs of 83.06% for acquirers and of 148.06% for targets [-5, +5].
Syriopoulos and Theotokas (2007)	Three bids for one firm in the tanker shipping segment in 2004.	Greatest CAR found to be 22.13% for the target and the lowest CAR of -22.40% calculated for one of the bidders using different event windows.
Samitas and Kenourgios (2007)	15 deals taking place between 2000 and 2007 in the tramp shipping segment.	Acquirers did not manage to create value for their shareholders around announcements.
Darkow et al. (2008)	200 deals in the logistics industry between 1991 and 2006.	CARs for entire acquirers and targets found to be 1.81% and 14.81% using event window [-20, +20], respectively.
Merikas *et al*. (2011)	60 companies between 1994 and 2009	Target companies are inefficient and less profitable in contrast to acquirers.
Andreou et al. (2012)	285 deals in the U.S. freight transportation industry between 1980 and 2009.	CARs of 2.3% and 24.5% calculated for acquirers and targets during [-10, +1], respectively.
Choi and Yoshida (2013)	2 cases from the Japanese shipping industry between 1998 and 1999.	Improvements in profitability and asset utilisation ratio through M&As.
Alexandrou et al. (2013)	1266 deals in the whole shipping industry from 1984 to 2011.	Event period returns for acquirers and targets found to be 1.2% and 3.3% over the same event window [-3, +1].
Alexandridis and Singh, 2016	6296 deals in the shipping industry from 1990 to 2014.	High freight rates tend to be linked to upsurge in acquisition activity.

Table 2 – *Descriptive Statistics.* The descriptive statistics show the number of firm-year observations, the mean, standard deviation, minimum, and maximum value of each variable. The data is collected from Compustat Global and North America and the frequency is annual. All variables apart from dividend-payer, all cash, public target, cross-border, diversification, and serial acquirer are winsorized at the upper and lower one percentile levels. See the Appendix A for the definition of variables.

Panel A: Company and Industry Characteristics					
	Observations	Mean	Standard Deviation	Min	Max
Market Leverage	6,695	0.474	0.277	0.000	0.981
Abnormal Leverage	6,111	0.000	0.114	-0.832	0.778
Tangibility	6,695	0.610	0.222	0.017	0.948
Profitability	6,695	0.092	0.068	-0.095	0.329
Operating Leverage	6,695	0.479	0.474	0.021	2.653
Total Assets ($ mil)	6,695	1480	10,100	2.07	776,000
Market-to-book	6,695	0.600	0.672	0.011	3.978
Asset Risk	6,695	0.193	0.149	0.006	0.857
Stock Return	6,695	0.113	0.568	-1.398	2.166
Dividend-payer	6,695	0.509	0.499	0.000	1.000
Intangibility	6,695	0.027	0.069	0.000	0.441
Cash Ratio	6,695	0.368	0.253	0.000	0.926
Capital Expenditures to Total Assets	6,695	0.081	0.096	0.000	0.509
Herfindahl-Hirschman Index	6,695	0.105	0.097	0.037	0.602
Industry M&A Liquidity	6,159	0.008	0.010	0.000	0.061
All Cash	535	0.205	0.404	0.000	1.000
Public Target	535	0.151	0.358	0.000	1.000
Cross-border	535	0.418	0.493	0.000	1.000
Diversification	535	0.285	0.452	0.000	1.000
Serial Acquirer	535	0.405	0.491	0.000	1.000
Deal Size ($ mil)	371	189	563	1.06	9,260
CAR	497	0.009	0.061	-0.164	0.205

Table 3 – *Target Capital Structure Regressions*. The table presents the results of capital structure regressions of leverage ratio on relevant determinants for selected sample years. Reported coefficients are average marginal effects. p-values are calculated by clustering the standard errors at the firm level and the standard errors are given in parentheses. Industry fixed effects indicate if the specification includes industry dummies for the six subsectors. Statistical significance levels of 10%, 5%, and 1% are denoted with *, **, and ***, respectively.

	1996	1997	2008	2009	2014	2015
TANGIBILITY	0.125	0.046	0.054	0.105**	0.007	0.020
	(0.096)	(0.078)	(0.044)	(0.050)	(0.042)	(0.040)
PROFITABILITY	-0.140	-0.683**	-0.214*	-0.188	-0.328**	-0.176
	(0.219)	(0.280)	(0.109)	(0.128)	(0.156)	(0.123)
OPERATING LEVERAGE	0.030	0.040	-0.007	-0.015	-0.051***	-0.067**
	(0.033)	(0.030)	(0.015)	(0.017)	(0.019)	(0.027)
ASSET RISK	0.486**	0.506***	0.238***	-0.322***	-0.252**	0.145
	(0.234)	(0.155)	(0.070)	(0.077)	(0.100)	(0.100)
DIVIDEND-PAYER STATUS	0.011	0.002	-0.005	-0.017	0.029**	0.012
	(0.030)	(0.024)	(0.015)	(0.014)	(0.014)	(0.016)
SIZE	-0.008	0.002	0.064***	0.007	-0.005	0.016
	(0.028)	(0.021)	(0.011)	(0.011)	(0.014)	(0.014)
MARKET-TO-BOOK	-0.022	-0.055	-0.043***	-0.153***	0.010	-0.090***
	(0.047)	(0.041)	(0.013)	(0.058)	(0.031)	(0.024)
LAGGED MARKET LEVERAGE	0.947***	0.805***	0.918***	0.459***	0.710***	0.645***
	(0.119)	(0.100)	(0.062)	(0.103)	(0.055)	(0.061)
STOCK RETURN	-0.039	-0.082**	0.028	0.026*	0.046	-0.015
	(0.064)	(0.034)	(0.020)	(0.013)	(0.029)	(0.022)
SECTOR FIXED EFFECTS	YES	YES	YES	YES	YES	YES
N	107	133	279	303	327	317
PROB>CHI2	0.000	0.000	0.000	0.000	0.000	0.000
PSEUDO R^2 (%)	16.22	20.33	18.41	20.58	19.94	22.17

Table 4 – *Acquisition Probability Models.* The table reports probit regressions of the acquisition probability on the abnormal leverage and other control variables. The target leverage is obtained from cross-sectional regressions of capital structure based on FRM with a logit function. Abnormal leverage is the difference between actual and target leverage. The dependent variable takes the value of 1 if the firm is an acquirer in year t and 0 otherwise. Reported coefficients are average marginal effects. Columns I to III present results of the acquisition probability regressions without the main variable of interest. The abnormal leverage variable is included in models IV, V and VI. Some specifications include year fixed effects and sector-specific variables. Estimated p-values are clustered at company level and standard errors are given in parentheses. Statistical significance levels of 10%, 5%, and 1% are denoted with *, **, and ***, respectively.

	I	II	III	IV	V	VI
PROFITABILITY	0.146**	0.106	0.071	0.137*	0.097	0.061
	(0.076)	(0.069)	(0.070)	(0.076)	(0.069)	(0.069)
ASSET INTANGIBILITY	0.185**	0.159*	0.190**	0.193**	0.167**	0.199**
	(0.087)	(0.085)	(0.087)	(0.087)	(0.085)	(0.087)
CASH RATIO	-0.015	-0.037*	-0.014	-0.016	-0.038*	-0.015
	(0.019)	(0.021)	(0.020)	(0.019)	(0.021)	(0.020)
CAPEX TO TOTAL ASSETS	0.009	0.012	0.018	0.027	0.032	0.038
	(0.047)	(0.047)	(0.046)	(0.048)	(0.047)	(0.047)
SIZE	0.066***	0.063***	0.066***	0.065***	0.062***	0.065***
	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
MARKET-TO-BOOK RATIO	-0.000	0.002	0.000	-0.001	0.000	-0.000
	(0.009)	(0.008)	(0.008)	(0.009)	(0.009)	(0.008)
STOCK RETURN	0.009	0.006	0.010	0.002	0.000	0.002
	(0.007)	(0.007)	(0.008)	(0.008)	(0.007)	(0.009)
M&A LIQUIDITY		0.031	0.004		0.033	0.007
		(0.022)	(0.034)		(0.022)	(0.034)
HERFINDAHL-HIRSCHMAN INDEX		0.040	0.007		0.041	0.004
		(0.048)	(0.070)		(0.048)	(0.070)
AVERAGE MARKET LEVERAGE	-0.056**	-0.054**	-0.061***	-0.054**	-0.052**	-0.058**
	(0.023)	(0.022)	(0.023)	(0.023)	(0.022)	(0.023)
ABNORMAL LEVERAGE				-0.080**	-0.081**	-0.087**
				(0.039)	(0.037)	(0.038)
YEAR FIXED EFFECTS	YES	NO	YES	YES	NO	YES
N	5,129	4,756	4,756	5,109	4,742	4,742
PROB > CHI2	0.000	0.000	0.000	0.000	0.000	0.000
PSEUDO R^2 (%)	7.61	5.54	7.54	7.69	5.62	7.63

Table 5 – *Deal Size Models.* The table reports OLS regressions of the deal size on the abnormal leverage and other control variables. The target leverage is obtained from cross-sectional regressions of capital structure based on FRM with a logit function. Abnormal leverage is the difference between actual and target leverage. The dependent variable is the natural logarithm of the deal value in $ mil. Columns I to III present results of the deal size regressions without the main variable of interest. The abnormal leverage variable is included in models IV, V and VI. Some specifications include year and fixed effects and sector-specific variables. Estimated p-values are clustered at company level and standard errors are given in parentheses. Statistical significance levels of 10%, 5%, and 1% are denoted with *, **, and ***, respectively.

	I	II	III	IV	V	VI
PROFITABILITY	-2.078	-2.690	-1.862	-1.902	-2.609	-1.639
	(2.186)	(2.114)	(2.223)	(2.132)	(2.127)	(2.121)
CASH RATIO	1.039***	1.312***	1.037*	1.058***	1.207***	1.064***
	(0.387)	(0.395)	(0.417)	(0.377)	(0.374)	(0.393)
CAPEX TO TOTAL ASSETS	-0.021	0.520	0.080	0.464	0.800	0.639
	(1.785)	(1.760)	(1.869)	(1.818)	(1.873)	(1.947)
ASSET TANGIBILITY	1.328***	1.097**	1.078*	1.240**	0.968*	1.030*
	(0.503)	(0.522)	(0.546)	(0.494)	(0.516)	(0.525)
SIZE	1.309***	1.292***	1.263***	1.368***	1.372***	1.333***
	(0.195)	(0.220)	(0.204)	(0.197)	(0.217)	(0.204)
MARKET-TO-BOOK RATIO	0.568***	0.713***	0.553***	0.459**	0.651**	0.433**
	(0.208)	(0.235)	(0.205)	(0.206)	(0.250)	(0.204)
STOCK RETURN	-0.131	0.045	-0.154	-0.397	-0.094	-0.469
	(0.266)	(0.232)	(0.288)	(0.300)	(0.259)	(0.330)
M&A LIQUIDITY		0.201	0.784		0.252	0.924
		(0.716)	(0.585)		(0.658)	(0.572)
HERFINDAHL-HIRSCHMAN INDEX		0.809	1.187		0.666	0.810
		(0.813)	(1.339)		(0.786)	(1.304)
ALL CASH	-0.397*	-0.395*	-0.483**	-0.441**	-0.431**	-0.530**
	(0.218)	(0.207)	(0.233)	(0.218)	(0.212)	(0.231)
SERIAL ACQUIRER	-0.091	-0.078	-0.052	-0.061	-0.059	-0.013
	(0.223)	(0.214)	(0.226)	(0.221)	(0.210)	(0.224)
CROSS-BORDER	0.087	0.053	0.062	0.051	0.079	0.037
	(0.222)	(0.223)	(0.255)	(0.216)	(0.220)	(0.246)
PUBLIC TARGET	0.426	0.514*	0.543*	0.344	0.426	0.454
	(0.277)	(0.275)	(0.289)	(0.263)	(0.263)	(0.276)
DIVERSIFICATION	-0.238	-0.168	-0.149	-0.260	-0.219	-0.160
	(0.260)	(0.237)	(0.261)	(0.252)	(0.226)	(0.250)
AVERAGE MARKET LEVERAGE	-1.142	-0.973	-1.079	-1.409*	-1.086	-1.483*
	(0.715)	(0.750)	(0.783)	(0.717)	(0.744)	(0.784)
ABNORMAL LEVERAGE				-2.614*	-2.158*	-3.033**
				(1.348)	(1.249)	(1.468)
CONSTANT	2.765	4.889**	3.201	6.310***	4.359**	5.927***
	(2.203)	(2.054)	(2.269)	(1.749)	(2.018)	(2.227)
YEAR FIXED EFFECTS	YES	NO	YES	YES	NO	YES
N	295	269	269	293	267	267
PROB > CHI2	0.000	0.000	0.000	0.000	0.000	0.000
R^2 (%)	23.6	23.8	24.0	24.9	25.8	26.0

Table 6 – *Payment Method Models*. The table reports probit regressions of the acquisition payment method on the abnormal leverage and other control variables. The target leverage is obtained from cross-sectional regressions of capital structure based on FRM with a logit function. Abnormal leverage is the difference between actual and target leverage. The dependent variable takes the value of 1 if a deal is financed with pure cash and 0 otherwise. Reported coefficients are average marginal effects. Columns I to III present results of the acquisition probability regressions without the main variable of interest. The abnormal leverage variable is included in models IV, V and VI. Some specifications include year fixed effects and sector-specific variables. Estimated p-values are clustered at company level and standard errors are given in parentheses. Statistical significance levels of 10%, 5%, and 1% are denoted with *, **, and ***, respectively.

	I	II	III	IV	V	VI
PROFITABILITY	0.225	-0.148	0.138	0.247	-0.150	0.171
	(0.507)	(0.489)	(0.534)	(0.499)	(0.485)	(0.528)
RELATIVE SIZE	-0.030**	-0.029*	-0.034**	-0.035**	-0.033**	-0.041***
	(0.014)	(0.015)	(0.015)	(0.014)	(0.015)	(0.014)
ASSET RISK	-0.278	-0.409*	-0.457**	-0.352	-0.525**	-0.530**
	(0.220)	(0.243)	(0.225)	(0.222)	(0.247)	(0.231)
CASH RATIO	0.169	0.122	0.162	0.180	0.118	0.170
	(0.129)	(0.133)	(0.126)	(0.127)	(0.131)	(0.123)
ASSET TANGIBILITY	-0.013	0.017	0.011	-0.004	0.014	0.019
	(0.173)	(0.161)	(0.184)	(0.170)	(0.160)	(0.180)
SIZE	0.004	-0.024	-0.024	0.010	-0.020	-0.020
	(0.058)	(0.057)	(0.050)	(0.056)	(0.056)	(0.048)
MARKET-TO-BOOK RATIO	-0.200*	-0.188*	-0.217**	-0.239**	-0.204*	-0.256***
	(0.105)	(0.110)	(0.091)	(0.113)	(0.118)	(0.094)
STOCK RETURN	0.060	0.134*	0.134	0.009	0.110	0.071
	(0.077)	(0.069)	(0.081)	(0.073)	(0.071)	(0.075)
M&A LIQUIDITY		0.663	0.426*		0.226	0.482**
		(0.546)	(0.212)		(0.165)	(0.214)
HERFINDAHL-HIRSCHMAN INDEX		0.050	0.776*		-0.014	0.746*
		(1.050)	(0.442)		(0.310)	(0.440)
SERIAL ACQUIRER	0.063	0.066	0.084	0.072	0.070	0.095*
	(0.055)	(0.057)	(0.055)	(0.056)	(0.058)	(0.055)
CROSS-BORDER	-0.112**	-0.134**	-0.179***	-0.116**	-0.131**	-0.182***
	(0.049)	(0.056)	(0.049)	(0.048)	(0.057)	(0.049)
PUBLIC TARGET	0.208***	0.178**	0.253***	0.189***	0.167**	0.238***
	(0.073)	(0.076)	(0.068)	(0.072)	(0.074)	(0.066)
DIVERSIFICATION	0.082	0.100	0.082	0.081	0.095	0.086
	(0.059)	(0.069)	(0.063)	(0.058)	(0.069)	(0.061)
AVERAGE MARKET LEVERAGE	-0.518***	-0.488***	-0.533***	-0.628***	-0.559***	-0.659***
	(0.158)	(0.177)	(0.167)	(0.161)	(0.185)	(0.160)
ABNORMAL LEVERAGE				-0.630**	-0.527*	-0.728***
				(0.250)	(0.260)	(0.258)
YEAR FIXED EFFECTS	YES	NO	YES	YES	NO	YES
N	284	269	259	284	269	259
PROB > CHI2	0.000	0.020	0.000	0.000	0.018	0.000
PSEUDO R^2 (%)	16.89	11.15	21.65	18.12	11.92	23.33

Table 7 – *Acquirer Return Models*. The table reports regressions of acquirer returns around the deal announcement day. The target leverage is obtained from cross-sectional regressions of capital structure based on FRM with a logit function. Abnormal leverage is the difference between actual and target leverage The dependent variable in the models is CAR to acquiring firms for a window of 5 days (-2, 2) around the acquisition announcement day. Columns I to III present results of the acquisition probability regressions without the main variable of interest. We include the abnormal leverage variable in models IV, V, and VI . Some specifications also include year and and industry (shipping subsector) fixed effects. Estimated p-values are clustered at company level and standard errors are given in parentheses. Statistical significance levels of 10%, 5%, and 1% are denoted with *, **, and ***, respectively.

	I	II	III	IV	V	VII
PROFITABILITY	0.073	0.124*	0.092	0.068	0.107	0.088
	(0.075)	(0.065)	(0.081)	(0.078)	(0.066)	(0.084)
RELATIVE SIZE	0.006***	0.006**	0.004*	0.007***	0.006**	0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
SIZE	0.004	0.001	-0.000	0.004	0.001	-0.001
	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)	(0.009)
MARKET-TO-BOOK RATIO	-0.002	-0.001	-0.000	0.001	0.002	0.002
	(0.009)	(0.007)	(0.009)	(0.009)	(0.007)	(0.009)
STOCK RETURN	-0.002	-0.002	-0.004	0.006	0.004	0.004
	(0.009)	(0.008)	(0.010)	(0.010)	(0.008)	(0.010)
M&A LIQUIDITY		0.017	0.053**		0.011	0.048*
		(0.013)	(0.025)		(0.012)	(0.024)
HERFINDAHL-HIRSCHMAN INDEX		0.049	0.057		0.058*	0.068
		(0.037)	(0.059)		(0.035)	(0.058)
SERIAL ACQUIRER	-0.004	-0.005	-0.007	-0.006	-0.006	-0.009
	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)
ALL CASH	0.007	0.009	0.004	0.008	0.010	0.006
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
CROSS-BORDER	0.012*	0.013**	0.013*	0.013**	0.014**	0.013*
	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.007)
PUBLIC TARGET	-0.019*	-0.021*	-0.020*	-0.016	-0.019*	-0.018
	(0.011)	(0.010)	(0.012)	(0.011)	(0.011)	(0.012)
DIVERSIFICATION	0.010	0.012	0.012	0.011	0.012	0.013
	(0.009)	(0.008)	(0.010)	(0.009)	(0.009)	(0.010)
AVERAGE MARKET LEVERAGE	-0.001	0.008	0.005	0.008	0.018	0.017
	(0.025)	(0.022)	(0.026)	(0.025)	(0.023)	(0.027)
ABNORMAL LEVERAGE				0.083*	0.073*	0.082*
				(0.044)	(0.039)	(0.046)
CONSTANT	-0.071	-0.002	0.008	-0.044	-0.008	0.011
	(0.083)	(0.076)	(0.086)	(0.082)	(0.078)	(0.089)
YEAR FIXED EFFECTS	YES	NO	YES	YES	NO	YES
N	284	259	259	282	257	257
PROB > CHI2	0.000	0.005	0.038	0.000	0.006	0.029
R^2 (%)	4.20	4.30	4.71	4.80	4.80	5.20

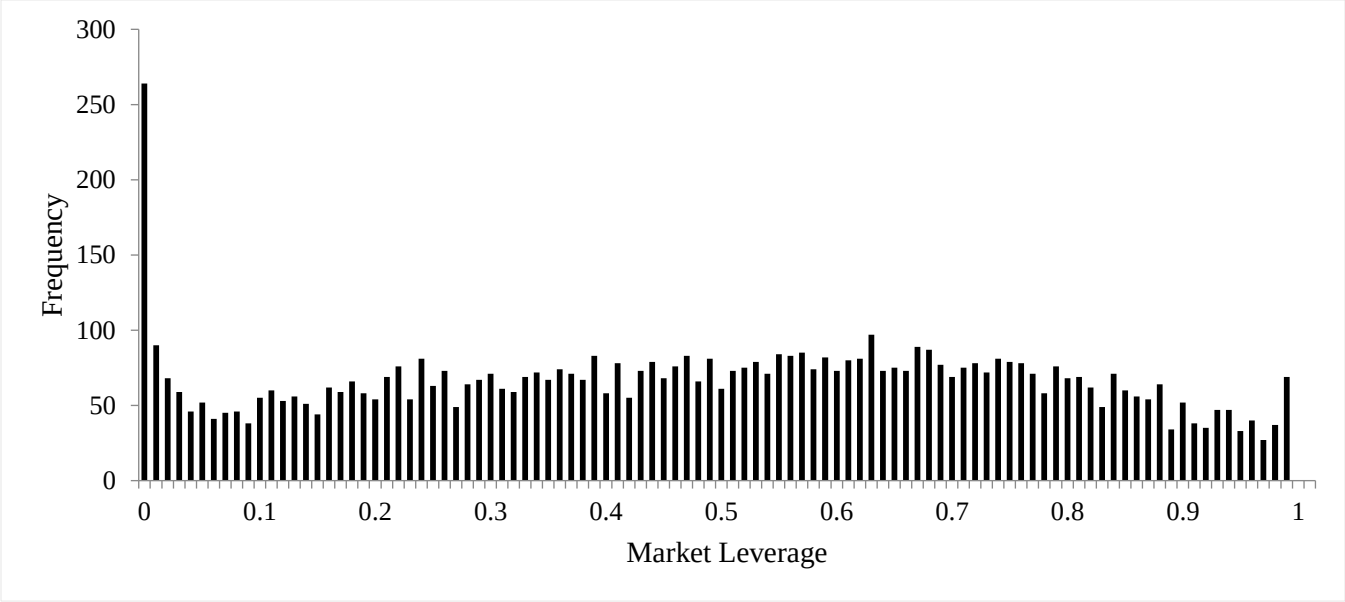


Figure 1 - *Distribution of Market Leverage.* The figure shows the distribution of market leverage of 6,695 firm-year observations over the period between 1990 and 2018.

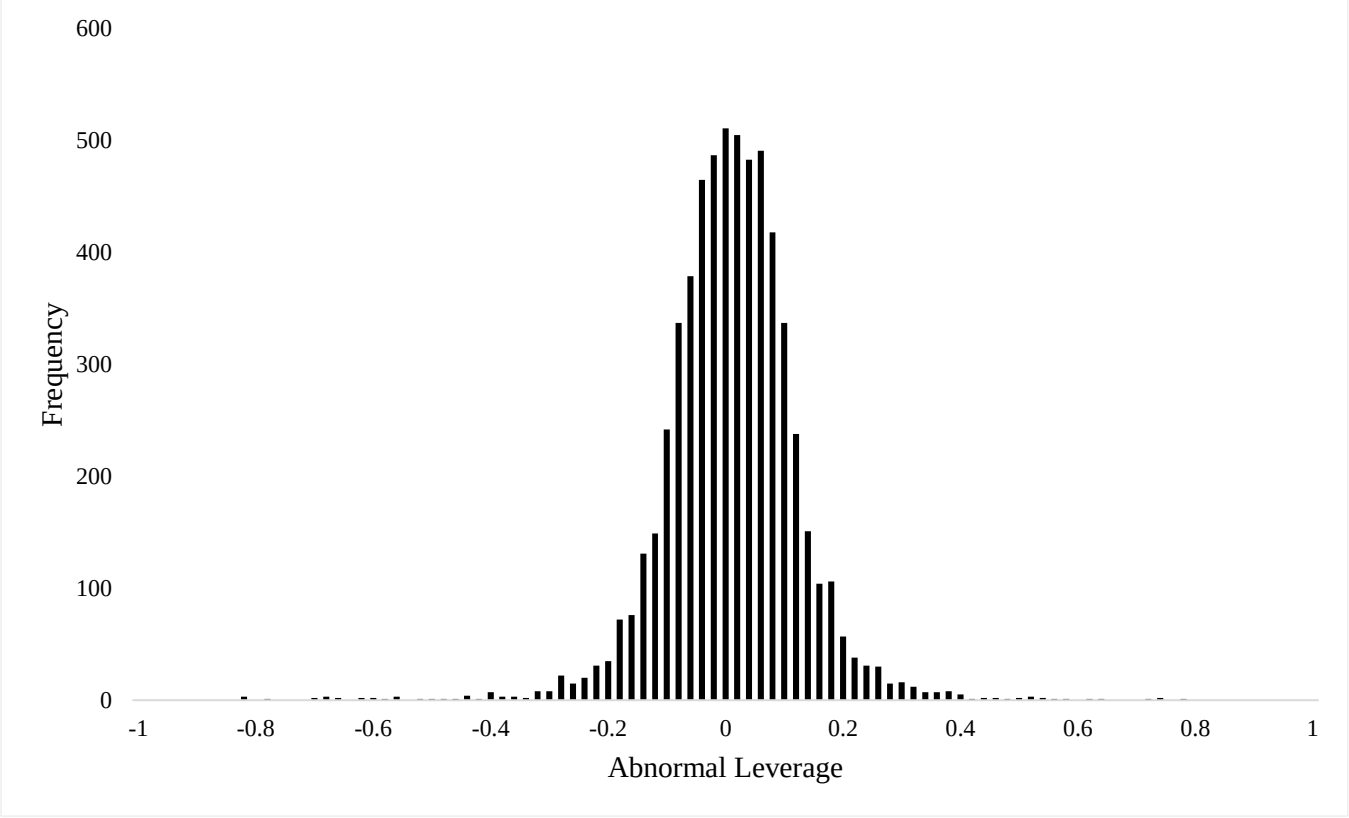
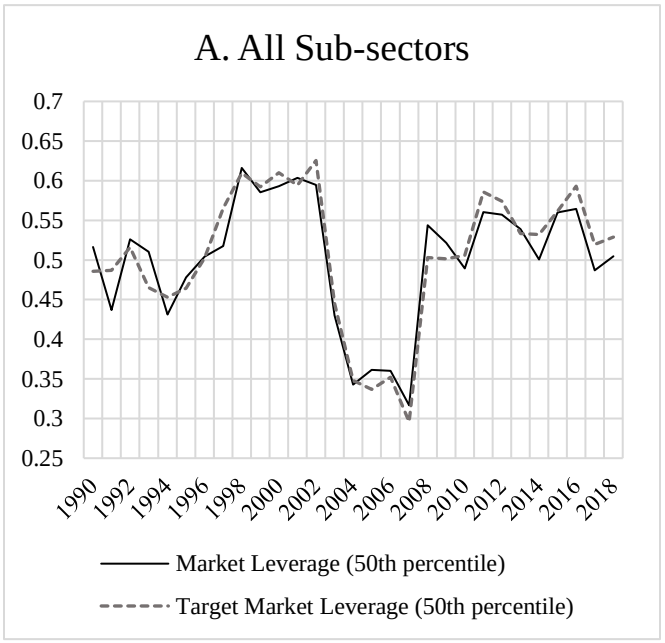
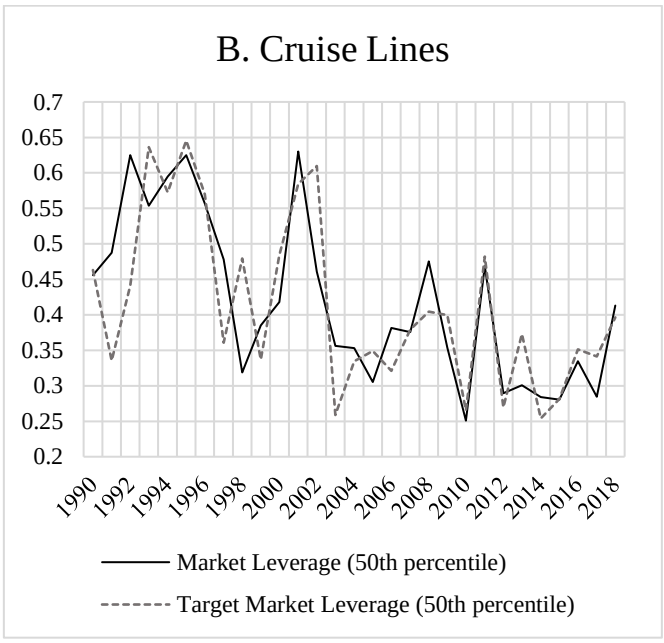
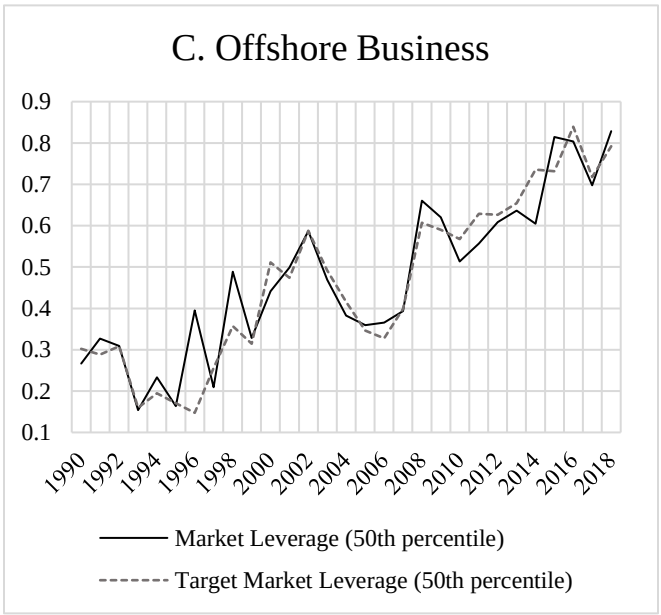
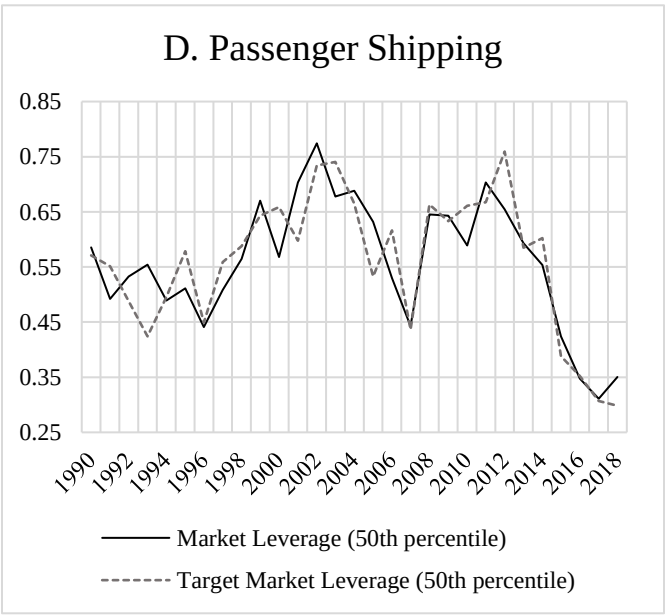


Figure 2. *Distribution of Abnormal Leverage.* The graph shows the distribution of abnormal leverage of 6,111 firm-year observations. We define the abnormal leverage as the difference between actual leverage and the fitted value of regressions predicting leverage.


A. All Sub-sectors
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Market Leverage (50th percentile)
Target Market Leverage (50th percentile)


B. Cruise Lines
0.7
0.65
0.6
0.55
0.5
0.45
0.4
0.35
0.3
0.25
0.2
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Market Leverage (50th percentile)
Target Market Leverage (50th percentile)


C. Offshore Business
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Market Leverage (50th percentile)
Target Market Leverage (50th percentile)


D. Passenger Shipping
0.85
0.75
0.65
0.55
0.45
0.35
0.25
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018
Market Leverage (50th percentile)
Target Market Leverage (50th percentile)

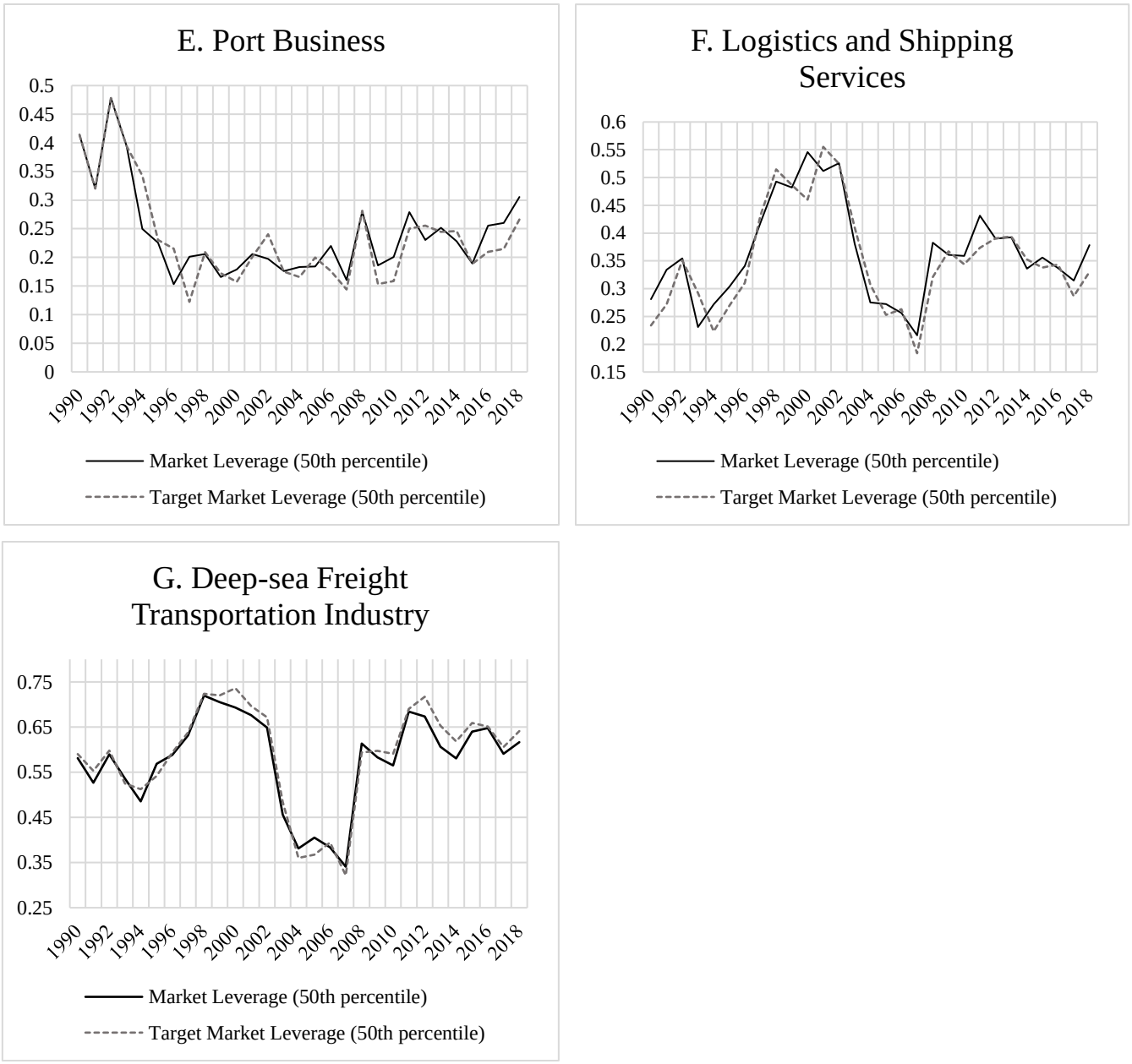


Figure 3. *Evolution of target market leverage over the sample period.* Figures A to G show the median values of market leverage and target market leverage over the sample period. Market leverage is the ratio of the sum of long- and -short term debt to the market value of assets and target market leverage is the fitted value of annual cross-sectional capital structure regressions.

APPENDIX

A. Definitions of variables

Market Leverage	The sum of long-term debt and short-term debt over the market value of assets measured at the end of fiscal year t.
Average Market Leverage	Three-year average market leverage, for years *t-1 to t-3.*
Tangibility	Ratio of fixed assets to total book assets measured at the end of year *t-1.*
Profitability	Ratio of operating income before depreciation over total book assets measured at the end of year *t-1.*
Market-to-book Ratio	Ratio of market value of assets over book value of assets measured at the end of year *t-1.*
Operating Leverage	Ratio of operating expense over total book assets measured at the end of year *t-1.*
Asset Risk	Annualised standard deviation of a company's daily stock price returns over the year *t-1.*
Dividend-paying Status	Dummy variable equal to one if a company pays dividends in year *t-1.*
Size	Natural logarithm of total book assets measured at the end of the year *t-1.*
Acquirer Status	Dummy variable equal to one if a company is an acquirer measured at the year *t.*
Cash Ratio	Cash and cash equivalents to total assets measured at the end of year *t-1.*
Stock Return	A firm's annual stock return over the year *t-1.*
Cross-border	Dummy variable equal to one if the nation of the acquirer and target is different.
All cash	Dummy variable equal to one if a deal is financed with pure cash.
Public target	Dummy variable equal to one if target company is publicly listed.
Diversification	Dummy variable equal to one if business areas of the acquirer and target are different.
Serial Acquirer	Dummy variable equal to one if a company undertakes at least 2 acquisitions in 3 years.
CAR	Cumulative abnormal returns to the acquirer over a 5-day window (-2,+2).
Deal Size	Natural logarithm of deal value($mil) measured at *t.*
Relative Size	The ratio of the deal value (*t)* over total assets of the acquirer measured at the end of year *t-1.*
Intangibility	Ratio of intangible assets (client lists, contract rights, copyrights, goodwill, operating rights, trademarks and tradenames) over total book assets measured at the end of year *t-1.*
M&A Liquidity	The sum of all deal values for each year divided by the sum of total assets for all companies in a given sector in year *t-1.*
HHI	Sum of the squares of the market shares of all firms sharing the same subsector in year *t-1.*

B. Capital Intensity of Shipping industry

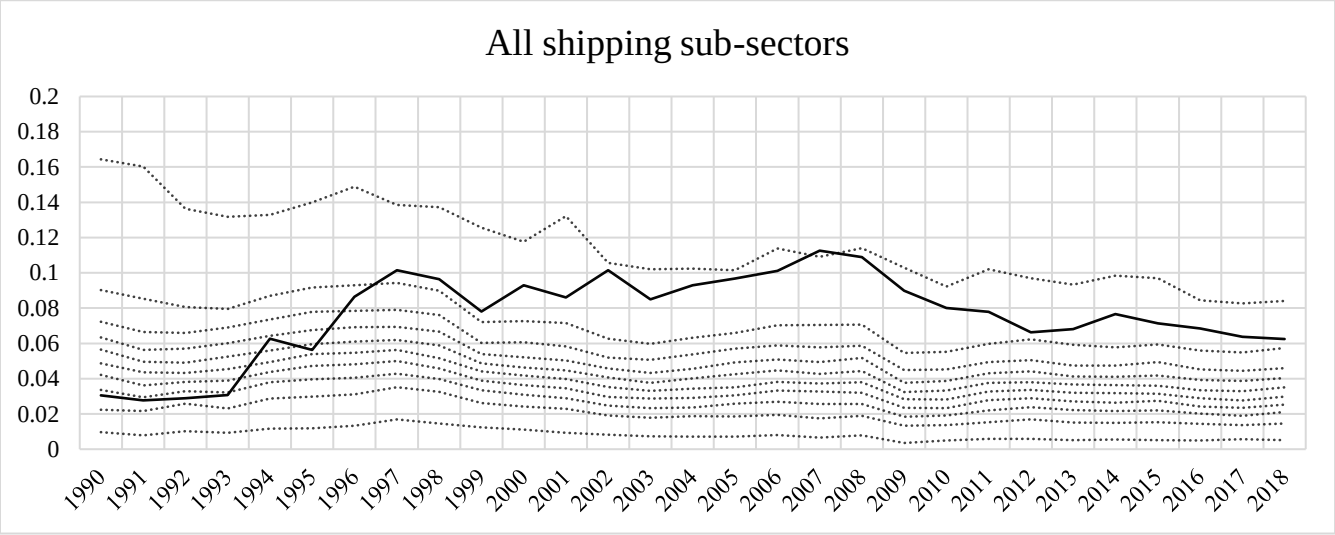


Figure B1. *Capital intensity of the shipping industry.* The figure shows the capital intensity of the shipping industry against Compustat Global and North America deciles over the sample period. Capital intensity is the ratio of capital expenditures to total book assets.